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**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

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| In the Matter of |) | |
| |) | |
| Revisions to Rules Authorizing the |) | WT Docket No. 08-166 |
| Operation of Low Power Auxiliary |) | |
| Stations in the 698-806 MHz Band |) | |
| |) | |
| Public Interest Spectrum Coalition, |) | WT Docket No. 08-167 |
| Petition for Rulemaking Regarding Low |) | |
| Power Auxiliary Stations, Including |) | |
| Wireless Microphones, and the Digital |) | |
| Television Transition |) | |
| |) | |
| Unlicensed Operation in the TV |) | ET Docket No. 04-186 (Ex Parte filing) |
| Broadcast Bands |) | |
| |) | |
| Additional Spectrum for Unlicensed |) | ET Docket No. 02-380 (Ex Parte filing) |
| Devices Below 900 MHz and in the 3 |) | |
| GHz Band |) | |

To: Office of the Secretary;
The Commission.

COMMENTS

And Response to the Initial Regulatory Flexibility Analysis ("IRFA")

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I. INTRODUCTION

Nady Systems, Inc., a pioneer in the development of high fidelity wireless microphones, recommends that the Federal Communications Commission take the following steps to balance the interests of wireless microphone users with the interests of emerging technology commercial services at the end of the Digital TV transition.

A. At the DTV transition, immediately prohibit the manufacture of wireless microphone devices designed for use in the 700 MHz band (channels 52-69).

B. At the DTV transition, allow users of wireless microphone devices in the 700 MHz band to gradually migrate by device attrition to white spaces below that band.

C. License by rule (fiat) wireless microphone use in the white spaces, secondary to Part 74, Subpart H individually licensed wireless microphone users and primary to emerging technology commercial device users.

II. BACKGROUND

The first commercially available low power wireless microphones appeared in the early 1960s, having poor audio quality. They were primarily designed for public address spoken word applications where frequency response and dynamic range were not important. In the early 1970s, John Nady, founder and CEO of Nady Systems, Inc., developed and patented a companding circuitry process that gave wireless microphones a dynamic range that set the industry standard for clear, natural sound. The companding process made possible the use of wireless microphones for music and other applications that required clear tones. Nady wireless microphones were used on the 1978 Grammy and Golden Globe Awards television shows. Nady outfitted Mick Jagger and the Rolling Stones with wireless microphones on their 1981 tour. By 1985, 85% of the world's top performing acts were using Nady wireless microphones. In 1987, Nady introduced low cost wireless. In 1996, Nady received an Emmy award from the National Academy of Television Arts and Sciences for Outstanding Technical Achievement in pioneering wireless microphone technology.

A. Unlicensed Wireless Microphone Use is Providing a Huge Public Benefit Without Interfering with Other Radio Band Uses

Wireless microphone use has proved to be an enormous public benefit and is continuing so. (See the many comments in favor of wireless microphone use in a variety of settings, filed in ET Docket No. 04-186.) Wireless microphones are an essential part of audio recordings, houses of worship, political town-hall meetings, live music concerts, courthouses, television broadcasts, film productions, live theatrical performances, business presentations, teaching hospitals and sports events to name a few. Use of wireless microphones has reduced the incidence of electric shock to performers and tripping over cords. Another benefit of wireless microphones is their relatively inexpensive, one-time cost to the consumer compared to the continuing cost to

subscribers of commercial broadband services. The high value placed on wireless microphones is reflected in the Public Interest Spectrum Coalition's (PISC) proposal that the Commission authorize a new General Wireless Microphone Service (GWMS) without requiring individual licenses.¹

Broadcast television stations operate on certain frequencies within the 54 to 806 MHz spectrum. Wireless microphones share this spectrum with television. Around 1977, the television industry began to fear that increasing wireless microphone use, if uncontrolled, would interfere with TV reception. They, and the related radio broadcasting and motion picture industries, obtained from the Commission the exclusive right to be licensed to use wireless microphones in the television broadcast spectrum.² Subsequently it became clear that interference with TV reception was not occurring, even with the dramatic increase in the use of unlicensed wireless microphones in the TV spectrum by persons who were outside those few industries eligible for licenses. Interference did not occur because wireless microphone power is so low that the much stronger TV signals overpower the wireless microphone signals. Conversely, TV signals interfere with the reception of wireless microphone receivers. Therefore wireless microphones, to avoid receiving interference, must operate in the vacant frequencies ("white spaces") between TV channels in each particular geographic area. If the user of a frequency agile wireless microphone encounters interference in a particular channel, the user switches to a vacant channel. If the user of a single channel wireless microphone travels to a geographic area where interference is encountered, he or she stops using the microphone in that area.

B. The FCC's Policy Toward Unlicensed Wireless Microphone Use Was Tacit Allowance and Benign Neglect

Throughout the 1980s and early 1990s, John Nady several times raised with FCC officials the question of whether FCC regulations needed changing so that the growing class of wireless microphone users who were ineligible to be licensed under the existing rules could become officially authorized. The officials told him that there is no need to change the licensing regulations—a cumbersome process—because since the FCC has not received complaints of wireless microphone interference with TV reception unlicensed use is not a problem. For over thirty years, the FCC has known about unlicensed wireless microphone use in the TV spectrum for purposes not authorized by regulation and has tacitly allowed that use to continue. For example, in opening up the 174-216 MHz TV spectrum to wireless microphones, the Commission noted "the need for wireless microphones used in special events coverage and in dramatic presentations

¹ In re Revisions to Rules Authorizing the Operation of Low Power Auxiliary Stations in the 698-806 MHz Band, WT Docket No. 08-166, and In re Public Interest Spectrum Coalition, Petition for Rulemaking Regarding Low Power Auxiliary Stations, Including Wireless Microphones, and the Digital Television Transition, WT Docket No. 08-167, *Notice of Proposed Rulemaking and Order*, at ¶21, (FCC 08-188) (698-806 MHz NPRM).

² See 47 CFR Part 74, Subpart H—Low Power Auxiliary Stations (LPAS), 47 CFR §74.802 and §74.832.

having a large number of performers.”³ The Commission stated: “We are confident that groups other than broadcast licensees can use these frequencies responsibly, obtaining the benefits of such use while being aware of the interference possibilities associated with it.”⁴ In 1992, the Commission observed, “commentators argue that experience with wireless microphones in the TV spectrum has shown that devices of this type end up being used by all sorts of people in places where they are not authorized by the rules.”⁵ The FCC’s policy of benign neglect toward unlicensed wireless microphone use in the TV spectrum has allowed the wireless microphone industry to develop technologically, fill a market need, enabled prices to come down as a result of volume production and opened up the benefits of wireless microphones to professionals not limited to the TV-radio-motion picture industry. Unlicensed wireless microphone users have for over thirty years been “good neighbor” de facto incumbents in the TV spectrum.

C. Auction of the “700 MHz Band” has Precipitated a Need to Regulate Unlicensed Wireless Microphone Use

The Digital Television Transition and Public Safety Act of 2005 mandates that television broadcasts use entirely digital signals by February 17, 2009. Digital technology allows TV channels to be grouped closer together than is possible with analog signals, thus freeing up spectrum for non-TV uses. By February 17, all TV channels will have moved to spectrum below 698 MHz, vacating the previously used 698-806 MHz spectrum (the “700 MHz Band”). Within the 700 MHz Band, the FCC has designated 763-775 and 793-805 MHz for public safety services and has auctioned off the balance of the band for commercial services. A purpose of the auction for commercial services is to encourage the development of emerging telecommunications technologies.⁶

On July 16, 2008, a coalition of emerging technology special interests, PISC, filed with the FCC an Informal Complaint and Petition for Rulemaking regarding unlicensed wireless microphone use in the 700 MHz Band. PISC’s filing requests that the Commission (1) begin an investigation against Shure, Inc. and other manufacturers of

³ Amendment of Part 2, and Subpart D, Part 74, of the Commission’s Rules and Regulations, with Respect to the Use of Wireless Microphones, ET Docket No. 92-9, *Report, Memorandum Opinion and Order*, at ¶4, 63 FCC2d 535 (1977) (*Emerging Technologies* proceeding).

⁴ *Id.* at ¶30.

⁵ Revisions to Broadcast Auxiliary Service Rules in Part 74 and Conforming Technical Rules for Broadcast Auxiliary Service, Cable Television Relay Service and Fixed Services in Parts 74, 78 and 101 of the Commission’s Rules, ET Docket No. 01-75, *Notice of Proposed Rule Making*, at ¶85, 16 FCC Rcd 10556, 10588 (2001).

⁶ In the Matter of Principles for Reallocation of Spectrum to Encourage the Development of Telecommunications Technologies for the New Millennium, *Policy Statement*, at ¶¶2 and 25, FCC 99-354; *see also*, In re Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, WT Docket No. 06-150, *Notice of Proposed Rule Making, Fourth Further Notice of Proposed Rule Making, and Second Further Notice of Proposed Rule Making*, at ¶24, *also*, *Second Report and Order*, at ¶75-76.

wireless microphones for marketing and selling wireless microphones to allegedly unauthorized users for ineligible purposes, (2) order that manufacture, sale, and advertising of wireless microphone systems operating on channels 52-69 cease immediately, (3) immediately reclassify all licensed wireless microphone systems operating pursuant to Part 74, Subpart H as secondary to all advanced wireless service (AWS) and public safety systems authorized to operate on television channels 52-69 following the shut off of analog television transmission, (4) create a new "General Wireless Microphone Service" (GWMS) licensed by rule pursuant to Section 307(e) to operate on vacant broadcast UHF channels below Channel 52 on a secondary basis to broadcast licensees and individually licensed wireless microphone systems and on a co-primary basis with to-be-authorized white space devices, and authorized on a primary basis to operate on the 2020-2025 MHz Band currently authorized for broadcast ancillary service (BAS), (5) permit the use of the alleged illegal equipment on a going forward basis until the Commission authorizes the proposed GWMS, and (6) require those manufacturers that engaged in allegedly illegal marketing to migrate the alleged unauthorized users of Part 74, Subpart H equipment to the GWMS by replacing equipment authorized for Part 74, Subpart H with equipment authorized for use in the GWMS.⁷ PISC's informal complaint naming wireless microphone manufacturer Shure, Inc. as lead respondent appears to be a counter-attack to Shure's submissions in ET Docket No. 04-186 that recommend that unlicensed, emerging technology devices operating in the white spaces after February 17, 2009 (devices and services supported by PISC's membership) employ mitigation techniques to protect wireless microphones against interference from those emerging technology devices.⁸

On August 15, 2008, the Commission adopted a Notice of Proposed Rulemaking and Order in response to PISC's petition.⁹ The Commission's notice sought comment on issues raised by PISC's petition,¹⁰ on the Commission's proposed rule that would prohibit the manufacture, import and sale of wireless microphones that operate in the 700 MHz Band effective on the date that the revised rule takes effect¹¹ and on the Commission's proposed rule that would prohibit the operation of wireless microphones in the 700 MHz Band after the DTV transition.¹²

⁷ In re Complaint of Public Interest Spectrum Coalition (PISC) Against Shure, Inc., Nady Systems, Inc., VocoPro, Audio2000, Sennheiser Electronic Corporation, Audix Microphones, Electro Voice, Hisonic International, Inc., Pyle Audio, et al. (July 16, 2008), *Informal Complaint and Petition of The Public Interest Spectrum Coalition*, at pp. i-ii, 32 (*PISC Petition*).

⁸ See, e.g., Shure's August 5, 2004 filing in ET Docket 04-186; see also, In re Unlicensed Operation in the TV Broadcast Bands, ET Docket No. 04-186, *First Report and Order and Further Notice of Proposed Rulemaking*, at fn. 23.

⁹ 698-806 MHz NPRM, *supra*.

¹⁰ *Id.* at ¶22.

¹¹ *Id.* at ¶17.

¹² *Id.* at ¶14.

III. THE LEGITIMATE INTERESTS OF THE EXISTING OWNERS AND THE MANUFACTURERS OF WIRELESS MICROPHONES OPERATING IN THE 700 MHz BAND MUST BE BALANCED AGAINST PISC'S SPECULATIVE FEAR OF INTERFERENCE

The FCC, in making new rules affecting wireless microphones, should balance the legitimate needs of existing wireless microphone users and manufacturers against the needs, rather than the fears, of the emerging technology winners of the 700 MHz auctions. That FCC general policy of balance was recognized by the courts: "The Commission correctly conceives of its role in prophetic and managerial terms: it must predict the effect and growth rate of technological new-comers on the spectrum, while striking a balance between protecting valuable existing uses and making room for these sweeping new technologies." *Teledesic LLC v. Federal Communications Commission*, 275 F.3d 75, 84 (D.C. Cir. 2001).

Wireless microphones are owned and used in a wide variety of industries, most of which are currently ineligible for licensing. Many of those wireless microphones currently operate only in the 700 MHz Band. Unlicensed wireless microphone use in spectrum restricted to Part 74, Subpart H licensees has provided an enormous public benefit notwithstanding PISC's disparagement of that use as "pirate."¹³ Contrary to PISC's argument, wireless microphone manufacturers did not "deceive" anyone by marketing wireless microphones for use in the TV spectrum to persons ineligible for licenses. The FCC was fully aware of those uses and allowed them to continue for decades. Wireless microphone manufacturers relied on that benign neglect for its marketing. In terms of interference, there has been no effective difference between licensed incumbent and unlicensed wireless microphone use in the TV spectrum. Where there is no harm, there is no foul.

The transition of wireless microphone use out of the 700 MHz Band should be gradual so as to not traumatically disrupt its existing beneficial use. Just as TV broadcasters' speculative fear of interference by wireless microphones never materialized, PISC's fear of interference by wireless microphones in the 700 MHz Band after the DTV transition is equally speculative and unjustified. PISC's "fear" is more likely a smokescreen intended to cover up its agenda to disparage wireless microphone users and manufacturers so that emerging technology users and manufacturers may obtain spectrum dominance, including licensing and competitive advantage, over wireless microphones in the "white spaces." The policy of regulatory neutrality should preclude the FCC from favoring emerging technologies over established wireless microphone technology.

It is improbable that wireless microphones used in the 700 MHz Band would interfere with public safety devices used in the Public Safety spectrum. Wireless microphones are very low power. In practice, their actual output is generally only a maximum of 15 milliwatts due to limitations of battery size and cost. For example, a first

¹³ PISC Petition, *supra*, p.15.

responder to a medical emergency at a performance or church, operating a public safety device at 5 watts, would be 3,000 times more powerful than any wireless microphones in the area. Furthermore, the reliable operating range of wireless microphones is in actuality limited to 100 feet under optimum conditions where there is no interference. Their range is further limited to only as little as 15 to 30 feet where interference is present or where walls reflect signals creating multi-path “null space” signal drop out. Wireless microphone use within range of medical telemetry would not be expected. Medical telemetry is not used by first responders. It is used in hospitals to transmit patient measurement data to a nearby receiver, permitting patient mobility and improved comfort.¹⁴

A. Gradual Migration of Wireless Microphone Users Out of the 700 MHz Band Strikes a Reasonable Balance that Protects Competing Interests

Wireless microphone users should migrate to the “white spaces” below the 700 MHz Band, but the transition to the lower bands should be done gradually not precipitously, causing as little disruption as possible. Indeed, even PISC recommends that the Commission “permit use of illegal equipment on a going forward basis until the Commission authorizes the proposed GWMS....”¹⁵ To accomplish a gradual migration of users, the manufacture, import, sale, offer for sale, or shipment of wireless microphones that operate in the 700 MHz Band should be prohibited *after the end of the DTV transition*. At that time, the use of wireless microphones in the 700 MHz Band will decline naturally by device attrition. Wireless microphone devices have a life on average of only a few years. They get banged up from travel. Users buy new, better models to replace their old ones. Interference from wireless microphones in the 700 Band is not anticipated. When a wireless microphone user experiences interference, he or she either switches channel or stops using the microphone in that geographic area. Virtually all wireless microphone use in the 700 MHz Band will most likely have ended by the time emerging technology commercial use in the band becomes established.

B. Emerging Technology Commercial Service Providers May Negotiate with Wireless Microphone Users to Migrate Out of the 700 MHz Band, or Pay for Them to Relocate Involuntarily, Before the Microphone Users Lose a Temporary License in that Band

If the emerging technology commercial service providers nevertheless are worried about the possibility in rare case of interference from wireless microphones, the Commission has a policy addressing the issue of incumbents’ interference with emerging technology devices planning to operate in the same spectrum. That policy, set forth in the *Emerging Technologies* proceeding, adopts a transition plan that provides for fair and

¹⁴ In re Amendment of Part 15 of the Commission’s Rules to permit operation of biomedical telemetry devices on VHF TV channels 7-13 and on UHF TV channels 14-36, ET Docket No. 95-177, *Memorandum Opinion and Order*, at ¶2, 17 FCC Rcd 8948 (2002).

¹⁵ PISC Petition, p.i.

equitable sharing of frequencies by new services and the existing services currently using the frequencies, and/or relocation of existing uses to other frequencies. The transition plan for sharing and/or relocation is intended to prevent disruption of existing services and minimize the economic impact on those services.¹⁶

The plan provides that during the transition period, the emerging technology providers may negotiate voluntary relocation agreements with the existing users of the frequency. During that period, the incumbent user shall have co-primary status with the emerging technology use.¹⁷ In keeping with PISC's recommendation that the Commission permit wireless microphone use in the 700 MHz Band on a going forward basis until the Commission authorizes the proposed GWMS, the Commission should license by rule (fiat) wireless microphone use in that band during the transition period on a co-primary basis with emerging technology commercial use and on a secondary basis with public safety use. Bidders at the 700 MHz Band auctions were not promised that the band would be wiped clear of other uses. The *Emerging Technologies* policy further provides that should voluntary negotiations fail, after a certain period of time the emerging technology provider may demand involuntary relocation.¹⁸ The emerging technology provider must pay all of the relocation costs of involuntary relocation until a "sunset" date.¹⁹ Applying that policy to wireless microphone use, after the "sunset" date, wireless microphone users would lose their license to operate in the 700 MHz Band. This plan encourages wireless microphone users to migrate out of the 700 MHz Band sooner than later by offering them the opportunity to have free new equipment as soon as they relocate (until the "sunset" date).²⁰ The 101 winners of the 700 MHz Band auction who together paid \$19 billion dollars for that license should have ample resources with which to pay for the relocation of any wireless microphones they are worried about.

In comparison, the majority of wireless microphone manufacturers, being "small entities",²¹ would go bankrupt if they had to finance migration of all wireless microphones operating in the 700 MHz Band. One of the Commission's goals is to protect beneficial existing services from being put of business by a ruling that would require it to replace equipment that it could ill afford.²² PISC's suggestion that the Commission order the wireless microphone manufacturers to pay the cost of replacing microphone systems

¹⁶ In re Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, ET Docket No. 92-9, *First Report and Order and Third Notice of Proposed Rulemaking*, ¶1, 7 FCC Rcd. 6886 (1993).

¹⁷ *Id.* at ¶24.

¹⁸ In re Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, ET Docket No. 92-9, *Third Report and Order and Memorandum Opinion and Order*, at ¶15, 8 FCC Rcd 6589, 6595 (1993).

¹⁹ Amendment to the Commission's Rules Regarding a Plan for Sharing the Costs of Microwave Relocation, WT Docket No. 95-157, *First Report and Order and Further Notice of Proposed Rulemaking*, at ¶¶1 and 65, FCC 96-196.

²⁰ *See, id.* at ¶67.

²¹ 698-806 MHz NPRM, *supra*, at Appendix ¶¶20 and 21.

²² *Teledesic, supra*, 275 F.3d at 306.

turns the *Emerging Technologies* policy on its head. Furthermore, the suggestion is entirely dependent on PISC's tortured legal assertion that the microphone manufacturers violated federal law by directing advertising at end users who may be ineligible to obtain LPAS licenses. No federal law was violated by wireless microphone manufacturers; no such law prohibits them from advertising wireless microphones to musicians or churches. Nor does federal law require them to answer for the acts or omissions of wireless microphone end users.

IV. WIRELESS MICROPHONES NEED PROTECTION IN THE WHITE SPACES FROM INTERFERENCE BY EMERGING TECHNOLOGY DEVICES

Wireless microphone use will be migrating to the white spaces below 700 MHz. Unlicensed wireless microphone users have been operating in those spaces for over 30 years. Consistent with PISC's recommendation that the Commission create a new GWMS in the white spaces for wireless microphones,²³ the Commission should license by rule previously unlicensed wireless microphones for operation in the UHF and VHF white spaces. All wireless microphone use has been, and should remain, secondary in status to that of TV broadcasting. (As a practicality, they must defer to TV broadcasting because of their low power.) It would be unnecessary and expensive to require wireless microphones to develop and incorporate "smart radio" technology to identify and avoid TV signals because there is no possible threat of them interfering with TV. Newly licensed by rule wireless microphone use should have secondary status to individually licensed Part 74, Subpart H wireless microphone users.

Wireless microphones provide important public services in a variety of contexts not limited to the broadcast and motion picture industries with the knowledge of the Commission, without interfering with TV reception. As a result, those unlicensed wireless microphone users are de facto incumbents entitled to certain rights similar to those of licensed, incumbent wireless microphone users. All wireless microphone use in the white spaces will require protection from interference by the emerging technology commercial devices being considered by the Commission in ET Docket No. 04-186. Otherwise, wireless microphones will not work properly and the public benefit they produce will disappear. Even PISC recognizes that wireless microphones used in the white spaces may need to be protected technologically from interference by emerging technology commercial devices.²⁴ Consistent with the Commission's "first-in-time" rule by which the first licensee is entitled to protection from interference by subsequent

²³ *PISC Petition, supra*, at pp.31-32.

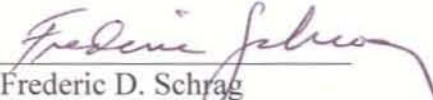
²⁴ *PISC Petition, supra*, at p.33. PISC recommends that a general wireless microphone license be granted on a *primary exclusive* basis for use in a certain non-white space band because of the likelihood of interference from emerging technology devices if the two technologies share the white spaces as co-primary users.

licensees,²⁵ wireless microphones that have been operating in the white spaces below 700 MHz for thirty years need and should have protected, primary status over new, emerging technology commercial devices. (As a balance, emerging technology commercial devices would have the entire 700 MHz Band to themselves after the proposed “sunset” date.)

Laudable is PISC’s recommendation that its proposed GWMS include bandwidth outside of the white spaces at 2020-2025 MHz dedicated solely to wireless microphone use. However, a 6 MHz bandwidth is too small to accommodate the needs of intense users of wireless microphone such as Broadway shows and large conventions. They need up to thirty wireless microphones operating simultaneously on separate channels. Thirty wireless microphones require at least 20 to 30 MHz of bandwidth to avoid interfering with each other at current technology. An only 6 MHz dedicated bandwidth is not a viable substitute for the protection that wireless microphones need against interference in the white spaces from emerging technology commercial devices.

Respectfully submitted,

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By: 
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October 3, 2008

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²⁵ See, In re Amendment of Section 2.106 of the Commission’s Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service, ET Docket No. 95-18, *Second Report and Order and Second Memorandum Opinion and Order*, at ¶133, 15 FCC Rcd 12,315.